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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/580,874	05/30/2000	Michel Ladang	192592USONPP-CONT	1709
22850	7590	05/24/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			GOFF II, JOHN L	
			ART UNIT	PAPER NUMBER
			1733	

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/580,874	<b>Applicant(s)</b> LADANG ET AL.	
	<b>Examiner</b> John L. Goff	<b>Art Unit</b> 1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10, 13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10, 13, 15 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### **DETAILED ACTION**

1. This action is in response to the request for reconsideration received 3/5/04.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Claim Rejections - 35 USC § 112***

3. Claims 10, 13, 15, and 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. See explanation in paragraph 5.
4. Claims 10, 13, 15, and 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. See explanation in paragraph 5.
5. The specification (page 5, lines 15-29) discloses a method for expanding a sheet of polyolefin foam only in its thickness wherein the method comprises a first step of surface crosslinking the sheet to form an intermediate product (its degree of surface crosslinking different than its core) followed by expanding the sheet. The specification appears to teach it is only surface crosslinking the foam sheet that brings about unidirectional expansion of the foam.

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The specification teaches the surface crosslinking may be accomplished by one of high-energy irradiation (it being noted the term "high-energy" is not defined in any context in an example or otherwise such that it requires anything other than irradiation), spraying of reactants, application of light radiation or corona discharge (it being noted the term "light radiation" is not further defined), or raising the temperature. It is unclear how merely surface crosslinking both faces of the foam sheet results in the sheet expanding only in its thickness. Tsujimoto et al. is cited as an example of applicants method wherein a sheet of polyolefin foam undergoes surface crosslinking (its degree of surface crosslinking different than its core) followed by expanding the foam.

Tsujimoto et al. teach the surface crosslinking occurs by irradiating a low-voltage electron beam at a high dosage, i.e. at least high-energy irradiation, light radiation, and raising the temperature.

However, Tsujimoto et al. teach the sheet expands in two directions, its thickness and width albeit the most preferred embodiments of Tsujimoto et al. expand 250% in the thickness and 78% in the width such that an essentially unidirectional expansion in the thickness occurs. Thus, in view of the prior art it is unclear how applicant achieves expansion in only one direction performing a method that is the same as that taught by the prior art.

6. Claims 10, 13, 15, and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "essentially" in claim 10 is a relative term which renders the claim indefinite. The term "essentially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what is required by an "essentially"

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unidirectional expansion. The specification discloses nothing in the form of an example or otherwise as to what is required by the term "essentially". Specifically, it is unclear what percentage of expansion must occur in one direction (as opposed to the other two directions) for the expansion to be considered "essentially" unidirectional?

***Claim Rejections - 35 USC § 102***

7. Claims 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsujimoto et al. (JP 04213341 and the English translation).

Tsujimoto et al. disclose a method for producing an expanded polyolefin foam sheet. Tsujimoto et al. teach a foam sheet comprising polyolefin (e.g. polyethylene, ethylene copolymer, etc.), crosslinking agent, and foaming agent. Tsujimoto et al. teach providing an unsupported, polyolefin foam sheet, surface-crosslinking both faces of the sheet (i.e. the degree of surface crosslinking is different from the sheets core) in a direction perpendicular to a direction of expansion to form an intermediate sheet, and then heating the intermediate sheet to expand (foam) and crosslink the sheet throughout. Tsujimoto et al. teach the surface crosslinking occurs by irradiating with a low-voltage electron beam at a high dosage, i.e. at least high-energy irradiation, light radiation, and raising the temperature, the voltage carefully chosen to irradiate (substantially) only the surface of the foam sheet. (See paragraphs 11, 15, 19, 33 and 34 of the translation). It is noted Tsujimoto et al. teach the sheet expands in two directions, the thickness and width. However, it is noted the sheet expands 250% in the thickness and 78% in the width (See Examples 6-11, paragraphs 33 and 34 of the translation corresponding to the most preferred embodiments, see in particular Key 13 of Table 2, of Tsujimoto et al.) such that the

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polyolefin foam sheet taught by Tsujimoto et al. undergoes an "essentially" unidirectional expansion in its thickness and thus, Tsujimoto et al. anticipates the claims. Furthermore, it is noted the method employed in Tsujimoto et al. is the same as that claimed by applicant and it is consistent and in agreement with applicants specification (Page 5, lines 15-29) such that the "essentially" unidirectional expansion taught by Tsujimoto et al. is inherently the same as that claimed.

Regarding claim 15, Tsujimoto et al. teach the foam sheet comprises at least 20% by weight of a polyethylene (See paragraphs 33 and 34 of the translation).

***Claim Rejections - 35 USC § 103***

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto et al. as applied above in paragraph 7, and further in view of Hitchcock (U.S. Patent 5,087,395).

Tsujimoto et al. as applied above teach all of the limitations in the claim except for a specific teaching on expanding the foam in a continuous operation. However, one of ordinary skill in the art at the time the invention was made would have readily appreciated producing the

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crosslinked and foamed sheet taught by Tsujimoto et al. using a continuous process as it was well known in the art to do so as shown by Hitchcock and only the expected results would be achieved, i.e. increased production greater than that achieved by a batch process.

Hitchcock is directed to the continuous expansion of a sheet of polyolefin foam. Hitchcock teaches a mixture of a thermoplastic resin (preferably polyethylene or an ethylene copolymer), a heat-decomposable blowing agent, and a crosslinking agent extruded into a desired shape such as a sheet (Column 4, lines 15-20 and 39-41). The surface of the sheet is further crosslinked offline by a suitable radiation source with the crosslinking occurring perpendicular to a direction of expansion of the foam (Column 1, lines 23-27 and Column 2, lines 59-63). The crosslinked sheet is fed to a preheating chamber and is raised to a temperature such that the sheet begins to foam and crosslink (due to the crosslinking agent) when passed into the foaming chamber (Column 2, lines 55-59 and Column 3, lines 42-47). The sheet undergoes expansion in its thickness while in the foaming chamber to form a foamed sheet (Figure 1 and Column 3, lines 42-47). The mixture of resin, blowing agent, and crosslinking agent is essentially ethylene copolymer or at least 20% by weight polyethylene (Column 5, lines 30-35 and Column 6, lines 22-27).

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto et al. as applied above in paragraph 7, and further in view of Hurley et al. (U.S. Patent 5,883,145).

Tsujimoto et al. as applied above teach all of the limitations in claim 16 except for a teaching on forming the polyethylene or ethylene copolymer by metallocene catalysis with a density of at most  $0.92 \text{ g/cm}^3$ . It is noted Tsujimoto et al. suggest in an exemplary embodiment to use low density polyethylene (density of 0.92). However, Tsujimoto et al. are not limited to

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any particular polyethylene. Hurley et al. are directed to manufacturing crosslinked polyolefin foam. Hurley et al. teach that it was known in the art to form polyolefin foams of very low density polyethylene (VLDPE) (density of 0.88 to 0.92 g/cm<sup>3</sup>) when a flexible foam is desired (Column 1, lines 52-58). However, these known foams tend to be of low quality due to melt fracture (Column 1, lines 61-64). The melt fracture occurring due to forming the VLDPE with a low molecular weight (Column 1, lines 58-61). Hurley et al. teach using metallocene catalysts as a means to form VLDPE of a controlled molecular weight ensuring the molecular weight of the VLDPE is high enough to preclude melt-fracture (Column 2, lines 16-22 and 52-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the polyethylene taught by Tsujimoto et al. a conventional polyethylene such as VLDPE formed using a metallocene catalyst as suggested by Hurley et al. to form a high quality flexible polyethylene (density of 0.88 to 0.92 g/cm<sup>3</sup>) foam that is not subject to melt fracture.

### ***Response to Arguments***

11. Applicant's arguments filed 8/25/03 have been fully considered but they are not persuasive. Applicant argues, "The key here is that **the two methods are not the same**. Tsujimoto (JP 1992-213341) effects **partial cross-linking using low-energy** radiation." and "Tsujimoto's method does not produce a foam whose expansion occurs essentially unidirectionally, because Tsujimoto's low-energy irradiation only results in partial crosslinking of the material. Since cross-linking occurs only to a partial extent, about 10-40%, Tsujimoto's product does not undergo essentially unidirectionally expansion, rather, expansion occurs both in the thickness and the width of the film. It is noted that there is 133% increase in the thickness



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and a 78% increase in the width upon expansion of Tsujimoto's foam, which corresponds to a 30-fold foaming expansion (p. 10., [0031]). This is not essentially unidirectional expansion.”

Regarding applicants argument that Tsujimoto teaches only crosslinking to a partial extent, it is noted neither the claims nor applicants specification require anything with regard to the percent/extent the surface is crosslinked. The claims and specification only disclose “surface crosslinking” a foam sheet such that “its degree of crosslinking is different from its core” (clearly disclosed by Tsujimoto and not argued by applicant) such that this argument is not commensurate in scope with the claims or applicants specification.

Regarding applicants arguments that Tsujimoto teaches using low-energy irradiation, it is noted the claims do not require any type of surface crosslinking energy such that this argument is not commensurate in scope with the claims. Additionally, as to applicants specification it is noted the specification discloses the surface crosslinking may be accomplished by one of high-energy irradiation, spraying of reactants, application of light radiation or corona discharge, or raising the temperature (See page 5, lines 15-29). The terms “high-energy” and “light radiation” are not defined in any context in an example or otherwise such that the terms require anything other than irradiation of the kind taught by Tsujimoto. Furthermore, as to accomplishing the surface crosslinking by “raising the temperature” it is noted this method is only further defined in that raising the temperature is carefully determined in terms of intensity and duration. Tsujimoto clearly teaches surface crosslinking by irradiating with a low-voltage electron beam at a high dosage (i.e. high energy) wherein the particulars of irradiation are carefully chosen such that only the surface is irradiated (See paragraphs 15 and 19 of the translation).

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Regarding applicants arguments that Tsujimoto does not teach essentially unidirectional expansion, it is noted the foam sheet of Tsujimoto expands 250% in the thickness and 78% in the width (See Examples 6-11, paragraphs 33 and 34 of the translation corresponding to the most preferred embodiments, see in particular Key 13 of Table 2) such that the polyolefin foam sheet taught by Tsujimoto undergoes an "essentially" unidirectional expansion in its thickness and thus, Tsujimoto et al. anticipates the claims." Furthermore, it is noted the method employed in Tsujimoto is the same as that claimed by applicant and it is consistent and in agreement with applicants specification (Page 5, lines 15-29) such that the "essentially" unidirectional expansion taught by Tsujimoto is inherently the same as that claimed. Additionally, it is noted that as to the term "essentially" applicant argues, "Applicants' specification provides clear examples as to the meaning of essentially unidirectional expansion." A review of applicants specification and in particular the examples give no guidance as to the meaning of the term "essentially".

Regarding applicants arguments to Hitchcock and Hurley, it is noted neither reference is cited to show unidirectional expansion.

### ***Conclusion***

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

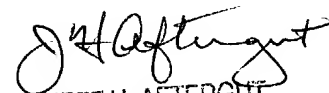
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is (571) 272-1216. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John L. Goff  
May 17, 2004



JEFF H. AFTERGUT  
PRIMARY EXAMINER  
GROUP 1300